

Creating Computational Interfaces or Fun with Pointing and Clicking

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Talk Overview

- **Brief overview of IU computational resources relating to computational interfaces**
- Using the Rstudio IDE and Rmarkdown
- Shiny applications and where to run them
- Notebooks and Jupyter
- Conclusions



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IU Research Computing Resources

- Compute
 - Batch scheduled supercomputers: Karst, **Carbonate**, BigRed 2, BigRed 2+
 - Interactive computation: Karst Desktop, **Research Desktop**, **Jetstream**
- Storage
 - **Data Capacitor 2**, Data Capacitor WAN, **Geode**



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Technologies in Today's Talk

- Languages
 - R, Python, SAS, Matlab



- Presentation layers/IDEs
 - Rstudio, Jupyter, Shiny



- Deployment/Delivery Mechanisms
 - Rstudio server, Shiny server, Jupyterhub, Shiny Proxy



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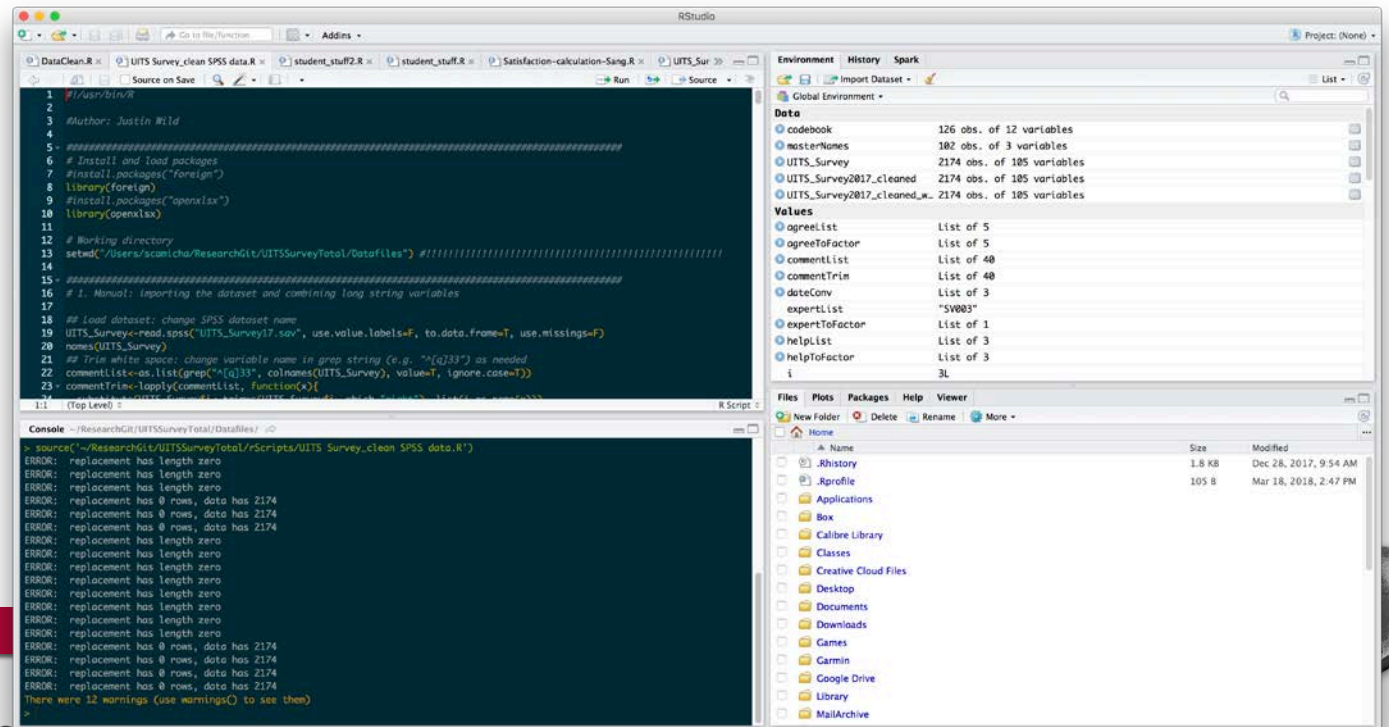
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R and the Rstudio IDE

- It's worth noting everything discussed today can be done through the command line
- However, using an IDE can provide some useful conveniences



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R and the Rstudio IDE

- R and Rstudio are both fairly easy to install on any operating system and are available on IU's central research infrastructure
- R is available on Big Red 2, Karst, and Carbonate
- Rstudio is available on Karst (Karst Desktop) and **Carbonate (Research Desktop)**
- Also available (until July) at <https://rstudio.iu.edu>



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✦What is Shiny?✦

- Shiny is a library in R that enables the creation of interactive web applications
- Code written entirely in R is rendered to produce an interactive HTML5 webpage
- Shiny apps generally need to be hosted somewhere, can present any data/representation that can be displayed in R, and can be embedded in other external websites



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✦✦What is Shiny Good For?✦✦

- Instruction: [Independent T-test](#)
- Information display: [Shiny Dashboard](#), [JS enhanced Dashboard](#)
- Production: [IU Virtual Tissue Bank](#)



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✦ How to Develop a Shiny App ✦

- Demonstration of a basic Shiny application on Research Desktop



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✦ How to Publish a Shiny App ✦

- There are several options for publishing a Shiny application
 - <https://www.shinyapps.io/> : Free tier is 5 apps and 25 active hours per month
 - [Intelligent Infrastructure](#): Get a VM, set it up, deploy Shiny
 - [Jetstream](#): Pre-created image with Shiny server installed



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What is Jupyter?

- Jupyter notebooks are a way to combine text and code that can be executed and edited in real time
- Jupyter notebooks support many different languages and frameworks
 - These require the language and a kernel to be installed in Jupyter
<https://github.com/jupyter/jupyter/wiki/Jupyter-kernels>
- Jupyter is a one line install via pip, conda, or your favorite package manager
- Jupyter notebooks are self-contained .xml type files which can be easily shared



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What is Jupyter Good For?

- Instruction:
<https://github.com/barbagroup/CFDPython/tree/master/lessons>
 - Embedding explanation along with working code examples
- Sharing work/Reproducibility
- Taking notes while working on code



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Where is Jupyter Available?

- Easy to install on your workstation/desktop
- Available on Karst Desktop and Research Desktop with a variety of kernels (just ask for more!)
- Jupyter Demo on ReD



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Future Improvements

- Research Desktop will become public beta in April
- Research Analytics is investigating a hosted Shiny application service (ShinyProxy) and may deploy it for testing in the coming months



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Questions?

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